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EXAMINER

ROYSTON, ELIZABETH

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/550,049	Applicant(s) GANZ ET AL.	
	Examiner Elizabeth Royston	Art Unit 1791	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 4/13/2009.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 5-18, 20-21 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 5-18, 20-21 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>9/21/2005</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Election/Restrictions

1. Applicant's election without traverse of Group II, claims 5-18, 20-21, in the reply filed on 4/13/09 is acknowledged.
2. Claims 1-4, 19 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to nonelected inventions, there being no allowable generic or linking claim.

Claim Objections

3. Claim 15 is objected to because of the following informalities: It is unclear if the limitation of "the same gas" in line 3 refers to two separate gas flows with the same composition or to a more literal interpretation of the same gas flowing from the internal bore to the external surface. The specification implies this is in fact two separate streams (p. 8-9, line 27-34, 1-8); however, the language of the claim should properly reflect this intent. Appropriate correction is required.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

6. Claims 5-7, 9-13, 17, 20, and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gänsicke (US PN 6516636 B1) in view of Kyoto (US PN 4664690) and Bartsch (DE 10332176 B4), US 2004/0129026 used for translation.

With regard to claims 5-7, Gänsicke teaches a method for producing a tube of synthetic silica glass in a vertical drawing method comprising continuously supplying a silica glass mass to a heating zone and softening the glass mass therein (col. 3, line 41-43), drawing a tube strand continuously off from a softened region of the silica glass mass (figure 1, item 18), the tube having an inner bore with a scavenging gas circulated through it (col. 3, line 35-40, 53-56), and obtaining a silica glass tube by cutting said tube strand to length (col. 4, line 47-48), where the front end of the tube strand is closed by a flow obstacle (figure 2, item 20).

Gänsicke does not explicitly disclose a flow obstacle which is permeable to the scavenging gas and which reduces the flow of the scavenging gas through the inner bore or a scavenging gas with a water content of less than 30 wtppb.

Bartsch teaches a flow obstacle formed by a plug which projects into the inner bore of the tube strand (figure 2, item 5) at the end of the tube strand which is

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permeable to and reduces the flow of the scavenging gas through the inner bore (figure 2, item 2, 4a/b, 5; paragraph 23, line 5-8) by narrowing the cross section of flow of the gas (paragraph 24).

It would have been obvious to one of ordinary skill in the art at the time of the invention to use the flow obstacle taught by Bartsch as the flow obstacle in the method taught by Gänsicke. The rationale to do so is provided by the motivation in the teaching of Bartsch, that to include the hole in the flow obstacle predictably allows for the increased internal pressure of the tube to maintain tube shape as desired by both Gänsicke and Bartsch, while preventing a too high overpressure from building up and damaging the glass tube (paragraph 31, line 13-17).

Kyoto teaches a method of dehydrogenating an optical glass preform using a substantially similar process with substantially similar materials in terms of the scavenging gas (col. 4, line 60), temperature (col. 5, line 65), flow (col. 5, line 63), and timing (col. 5, line 66) as claimed by applicant. Kyoto further teaches the scavenging gas to be "pure" (col. 3, line 24). Although Kyoto does not explicitly state the water content of the scavenging gas to be less than 30 wtppb, since the final OH concentration in the product taught by Kyoto (col. 6, line 14) is the same as the final OH concentration in the product produced by applicant (less than 0.1 ppm), the water concentration in the gas as taught by Kyoto would inherently have been less than 30 wtppb.

It would have been obvious to one of ordinary skill in the art at the time of the invention to use the materials and conditions taught by Kyoto in the method taught by

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Gänsicke in view of Bartsch. The rationale to do so is provided by the motivation found in the teaching of Kyoto, that to use the scavenging gas at the taught conditions predictably reduces the OH concentration of the glass preform thereby resulting in a low attenuation of light transmission (col. 1, line 45-53; col. 3, line 19-20).

With regard to claim 9, Gänsicke teaches a silica glass mass provided in the form of a hollow cylinder which is continuously fed to a heating zone and softened in portions (col.3, line 41-43; figure 1, item 1 and 5), with the tube strand continuously drawn off from the softened region (figure 1, item 18) to at least 5 times its initial length (calculated from the diameters of the pre and post drawn tubes in example 1).

With regard to claim 10, although Gänsicke in view of Bartsch and Kyoto does not explicitly disclose drawing the glass to at least 20 times the initial length, it would have been obvious to one of ordinary skill in the art at the time of the invention to optimize the volume/mass of the initial silica mass and the diameters of the inner and outer walls of the drawn tube such that the draw length was 20 times the initial length, if such a length was desired.

With regard to claims 11 and 20, Kyoto teaches a scavenging gas with a chlorine gaseous drying agent (col. 4, line 61-63; example 1; table 2).

It would have been obvious to one of ordinary skill in the art at the time of the invention to use chlorine gaseous drying agent taught by Kyoto in the method taught by

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Gänsicke in view of Bartsch. The rationale to do so is provided by the motivation found in the teaching of Kyoto, that to use the chlorine dehydrating agent predictably reduces the OH concentration of the glass preform thereby resulting in a low attenuation of light transmission (col. 1, line 45-53; col. 3, line 19-20).

With regard to claim 12, although Gänsicke in view of Bartsch and Kyoto does not explicitly disclose the scavenging gas being subjected to a drying process prior to introduction to the inner bore of the tube strand, given that the scavenging gas is used as a drying (dehydrating) gas (Kyoto, col. 4, line 59), it would have been obvious to one of ordinary skill in the art to use a drying gas that doesn't already contain the contaminant that the gas is designed to remove from the glass, and to thus take steps to ensure the drying gas is initially contaminant free.

With regard to claim 13, Kyoto teaches a volume flow of scavenging gas not exceeding 80 l/min (example 1, table 2, flow rate of gas; example 2, col. 6, line 46).

It would have been obvious to one of ordinary skill in the art at the time of the invention to use the flow rate taught by Kyoto in the method taught by Gänsicke in view of Bartsch. The rationale to do so is provided by the motivation found in the teaching of Kyoto, that to use the flow rates taught by Kyoto predictably reduces the OH concentration of the glass perform, thereby resulting in a low attenuation of light transmission (col. 1, line 45-53; col. 3, line 19-20).

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With regard to claim 17, Kyoto teaches the silica glass tube is subjected to an OH reduction treatment at a temperature of at least 900°C (col. 5, line 62-66). Although Kyoto does not explicitly disclose the atmosphere as being water free, Kyoto does not teach water as part of the dehydrating gas. Furthermore, since the purpose of the environment is to remove water from the glass, it would have been obvious to one of ordinary skill in the art to start with an environment free of the water contaminant so as to maximize the environment's efficacy at water removal from the glass.

It would have been obvious to one of ordinary skill in the art at the time of the invention to use the OH reduction treatment and temperature taught by Kyoto in the method taught by Gänsicke in view of Bartsch. The rationale to do so is provided by the motivation found in the teaching of Kyoto, that to use a temperature of at least 900°C predictably reduces the OH concentration of the glass perform (col. 4, line 64-65), thereby resulting in a low attenuation of light transmission (col. 1, line 45-53; col. 3, line 19-20).

With regard to claim 21, Gänsicke teaches the drawn tube as a substrate in the MCVD method (col. 3, line 22) for making high-purity glass quartz glass (col. 3, line 18).

7. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Gänsicke (US PN 6516636 B1) in view of Bartsch (DE 10332176 B4), US 2004/0129026 used for translation, and Kyoto (US PN 4664690), as applied for claims 5 and 6 above, and in further view of Lebert (US PN 4165223).

With regard to claim 8, Gänsicke in view of Bartsch and Kyoto does not explicitly disclose a gas flow obstacle.

Lebert teaches a gas flow obstacle (col. 3, line 53).

It would have been obvious to one of ordinary skill in the art at the time of the invention to use the gas flow obstacle taught by Lebert as the plug in the method taught by Gänsicke in view of Bartsch and Kyoto. The rationale to do so is provided by the motivation found in the teaching of Lebert, that to use a gas flow obstacle predictably allows for an increased pressure of the pipe interior (col. 1, line 58-61) resulting in the formation of pipes with a minimum of deviations in the diameter (col. 1, line 35-38).

8. Claims 14 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gänsicke (US PN 6516636 B1) in view of Bartsch (DE 10332176 B4), US 2004/0129026 used for translation, and Kyoto (US PN 4664690), as applied for claims 5 and 6 above, and in further view of Powers (US PN 4165223).

With regard to claims 14 and 15, Gänsicke in view of Bartsch and Kyoto does not explicitly disclose an external scavenging gas flowing around the outer cladding of the tube strand in the region of the heating zone with the external scavenging gas having a water content a factor of 10 greater than the water content of the internal scavenging gas, and where the same gas is used for both the internal and external scavenging gas.

Powers teaches an external scavenging gas flowing around the outer cladding of the tube strand in the region of the heating zone, where the same gas, and thus resulting gas composition, is used for both the internal and external scavenging gases

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(col. 6, line 27-29; figure 5, item 82, arrows representing the same gas flowing from the inner channel, coming out from bottom of tubular preform and through the preform walls). Although Powers does not explicitly teach a water content of the external scavenging gas a factor of 10 greater than the internal scavenging gas, it would have been obvious to one of ordinary skill in the art at the time of the invention that the internal scavenging gas, after removing the water contaminant from the inner channel portion of the glass tube preform, would contain the removed water as it passed the external surface of the preform.

It would have been obvious to one of ordinary skill in the art at the time of the invention to use the same gas for the external and internal scavenging gas as taught by Powers, with the dehydrating process taught by Gänsicke in view of Bartsch and Kyoto. The rationale to do so is provided by the motivation in the teaching of Powers, that drying the preform using this method predictably results in a reduction in the profile distortion of the index of refraction of the optical fiber (col. 11, 20-25).

9. Claim 16 is rejected under 35 U.S.C. 103(a) as being unpatentable over Gänsicke (US PN 6516636 B1) in view of Bartsch (DE 10332176 B4), US 2004/0129026 used for translation, Kyoto (US PN 4664690), and Powers (US PN 4165223), as applied for claims 5 and 14 above, and in further view of DeLuca (US PN 3933454).

With regard to claim 16, Gänsicke in view of Bartsch, Kyoto, and Powers does not explicitly disclose the external scavenging gas flowing around the outer cladding of

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the tube strand while the strand is cooled to a temperature below 900°C. Although Powers teaches the scavenging gas flow continues through the initial dehydration and consolidation phases (col. 8, line 25-34; col. 13, line 45), Powers does not make any mention of the gas flow, whether present or absent, with regard to the cooling step (col. 13, line 46-47).

DeLuca teaches the external scavenging gas flowing around the outer surface of the preform while the preform is cooled to a temperature below 900°C after the consolidation process (col. 9, line 37-38, 55-59; col. 10, line 17-20; figure 4, item A-D, and 74).

It would have been obvious to one of ordinary skill in the art at the time of the invention to flow the scavenging gas at the temperatures taught by DeLuca in the method taught by Gänsicke in view of Bartsch, Kyoto, and Powers. The rationale to do so is found in the motivation provided by the teaching of DeLuca, that to provide the scavenging gas as the temperature is lowered below 900°C predictably results in a slight annealing of the dense glass body with low water content (col. 10, line 17-20, 25-27).

10. Claim 18 is rejected under 35 U.S.C. 103(a) as being unpatentable over Gänsicke (US PN 6516636 B1) in view of Bartsch (DE 10332176 B4), US 2004/0129026 used for translation, and Kyoto (US PN 4664690), as applied to claims 5 and 17 above, and in further view of Freund (US PN 4685945).

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With regard to claim 18, Gänsicke in view of Bartsch and Kyoto does not explicitly disclose an OH reduction treatment with a deuterium-containing atmosphere.

Freund teaches OH reduction treatment with a deuterium-containing atmosphere.

It would have been obvious to one of ordinary skill in the art at the time of the invention to use a deuterium-containing atmosphere to dehydrate the glass in the method taught by Gänsicke in view of Bartsch and Kyoto. The rationale to do so is provided by the motivation found in the teaching of Freund, that to use a deuterium-containing atmosphere predictably avoids the formation of additional OH in the glass over time (col. 3, line 17-24).

11. Claims 5-7, 9-13, 17, 20, and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gänsicke (US PN 6516636 B1) in view of Kyoto (US PN 4664690), Karbassiyoon (US PN 4632684), and Achener (US PN 3907536).

With regard to claims 5-7, Gänsicke teaches a method for producing a tube of synthetic silica glass in a vertical drawing method comprising continuously supplying a silica glass mass to a heating zone and softening the glass mass therein (col. 3, line 41-43), drawing a tube strand continuously off from a softened region of the silica glass mass (figure 1, item 18), the tube having an inner bore with a scavenging gas circulated through it (col. 3, line 35-40, 53-56), and obtaining a silica glass tube by cutting said tube strand to length (col. 4, line 47-48), where the front end of the tube strand is closed by a flow obstacle (figure 2, item 20).

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Gänsicke does not explicitly disclose a flow obstacle which is permeable to the scavenging gas and which reduces the flow of the scavenging gas though the inner bore or a scavenging gas with a water content of less than 30 wtppb.

Karbassiyoon teaches heating a glass preform with a continuous flow of gas through the center (figure 1, item 2) held at a controlled super atmospheric pressure (col. 3, line 27-29) with a flow obstacle formed by a plug that narrows the cross section of the gas flow (col. 4, line 15, item 28; col. 5, line 7-15) which is permeable to the flow and reduces the flow of the gas through the inner bore of the tube (item 2).

It would have been obvious to one of ordinary skill in the art at the time of the invention to use the restricted flow taught by Karbassiyoon in the method taught by Gänsicke. The rationale to do so would have been provided by the motivation found in the teaching of Karbassiyoon, that to use such a flow system predictably prevents the deterioration of the optical properties of the inner surface of the glass preform (col. 2, line 18-21).

Gänsicke in view of Karbassiyoon does not explicitly disclose the projection of the flow obstacle into the inner bore of the tube strand.

Achener teaches a flow obstacle formed by a plug which projects into the inner bore of the tube strand (figure 5, item 86, 86a) and reduces the flow of the gas through the inner bore by narrowing the cross section of flow of the gas (figure 5, item 88).

It would have been obvious to one of ordinary skill in the art at the time of the invention to use the plugs of Achener in the method taught by Gänsicke in view of Karbassiyoon. The rationale to do so would have been provided by the motivation

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found in the teaching of Achener, that to use such plugs to control the flow predictably results in the ability to simultaneously inflate and draw the glass tube (col. 5, line 43-44), without bulging (col. 5, line 51-55), while maintaining the desired internal pressure differential (col. 5, line 33-35).

Kyoto teaches a method of dehydrogenating an optical glass preform using a substantially similar process with substantially similar materials in terms of the scavenging gas (col. 4, line 60), temperature (col. 5, line 65), flow (col. 5, line 63), and timing (col. 5, line 66) as claimed by applicant. Kyoto further teaches the scavenging gas to be "pure" (col. 3, line 24). Although Kyoto does not explicitly state the water content of the scavenging gas to be less than 30 wtppb, since the final OH concentration in the product taught by Kyoto (col. 6, line 14) is the same as the final OH concentration in the product produced by applicant (less than 0.1 ppm), the water concentration in the gas as taught by Kyoto would inherently have been less than 30 wtppb.

It would have been obvious to one of ordinary skill in the art at the time of the invention to use the materials and conditions taught by Kyoto in the method taught by Gänsicke in view of Bartsch. The rationale to do so is provided by the motivation found in the teaching of Kyoto, that to use the scavenging gas at the taught conditions predictably reduces the OH concentration of the glass preform thereby resulting in a low attenuation of light transmission (col. 1, line 45-53; col. 3, line 19-20).

With regard to claim 9, Gänsicke teaches a silica glass mass provided in the form of a hollow cylinder which is continuously fed to a heating zone and softened in portions (col.3, line 41-43; figure 1, item 1 and 5), with the tube strand continuously drawn off from the softened region (figure 1, item 18) to at least 5 times its initial length (calculated from the diameters of the pre and post drawn tubes in example 1).

With regard to claim 10, although Gänsicke in view of Karbassiyoon, Achener, and Kyoto does not explicitly disclose drawing the glass to at least 20 times the initial length, it would have been obvious to one of ordinary skill in the art at the time of the invention to optimize the volume/mass of the initial silica mass and the diameters of the inner and outer walls of the drawn tube such that the draw length was 20 times the initial length, if such a length was desired.

With regard to claims 11 and 20, Kyoto teaches a scavenging gas with a chlorine gaseous drying agent (col. 4, line 61-63; example 1; table 2).

It would have been obvious to one of ordinary skill in the art at the time of the invention to use chlorine gaseous drying agent taught by Kyoto in the method taught by Gänsicke in view of Karbassiyoon and Achener. The rationale to do so is provided by the motivation found in the teaching of Kyoto, that to use the chlorine dehydrating agent predictably reduces the OH concentration of the glass preform thereby resulting in a low attenuation of light transmission (col. 1, line 45-53; col. 3, line 19-20).

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With regard to claim 12, although Gänsicke in view of Karbassiyoon, Achener, and Kyoto does not explicitly disclose the scavenging gas being subjected to a drying process prior to introduction to the inner bore of the tube strand, given that the scavenging gas is used as a drying (dehydrating) gas (Kyoto, col. 4, line 59), it would have been obvious to one of ordinary skill in the art to use a drying gas that doesn't already contain the contaminant that the gas is designed to remove from the glass, and to thus take steps to ensure the drying gas is initially contaminant free.

With regard to claim 13, Kyoto teaches a volume flow of scavenging gas not exceeding 80 l/min (example 1, table 2, flow rate of gas; example 2, col. 6, line 46).

It would have been obvious to one of ordinary skill in the art at the time of the invention to use the flow rate taught by Kyoto in the method taught by Gänsicke in view of Karbassiyoon and Achener. The rationale to do so is provided by the motivation found in the teaching of Kyoto, that to use the flow rates taught by Kyoto predictably reduces the OH concentration of the glass perform, thereby resulting in a low attenuation of light transmission (col. 1, line 45-53; col. 3, line 19-20).

With regard to claim 17, Kyoto teaches the silica glass tube is subjected to an OH reduction treatment at a temperature of at least 900°C (col. 5, line 62-66). Although Kyoto does not explicitly disclose the atmosphere as being water free, Kyoto does not teach water as part of the dehydrating gas. Furthermore, since the purpose of the environment is to remove water from the glass, it would have been obvious to one of

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ordinary skill in the art to start with an environment free of the water contaminant so as to maximize the environment's efficacy at water removal from the glass.

It would have been obvious to one of ordinary skill in the art at the time of the invention to use the OH reduction treatment and temperature taught by Kyoto in the method taught by Gänsicke in view of Karbassiyoon and Achener. The rationale to do so is provided by the motivation found in the teaching of Kyoto, that to use a temperature of at least 900°C predictably reduces the OH concentration of the glass perform (col. 4, line 64-65), thereby resulting in a low attenuation of light transmission (col. 1, line 45-53; col. 3, line 19-20).

With regard to claim 21, Gänsicke teaches the drawn tube as a substrate in the MCVD method (col. 3, line 22) for making high-purity glass quartz glass (col. 3, line 18).

12. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Gänsicke (US PN 6516636 B1) in view of Karbassiyoon (US PN 4632684), Achener (US PN 3907536), and Kyoto (US PN 4664690), as applied for claims 5 and 6 above, and in further view of Lebert (US PN 4165223).

With regard to claim 8, Gänsicke in view of Bartsch and Kyoto does not explicitly disclose a gas flow obstacle.

Lebert teaches a gas flow obstacle (col. 3, line 53).

It would have been obvious to one of ordinary skill in the art at the time of the invention to use the gas flow obstacle taught by Lebert as the plug in the method taught

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by Gänsicke in view of Karbassiyoon, Achener, and Kyoto. The rationale to do so is provided by the motivation found in the teaching of Lebert, that to use a gas flow obstacle predictably allows for an increased pressure of the pipe interior (col. 1, line 58-61) resulting in the formation of pipes with a minimum of deviations in the diameter (col. 1, line 35-38).

13. Claims 14 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gänsicke (US PN 6516636 B1) in view of Karbassiyoon (US PN 4632684), Achener (US PN 3907536), and Kyoto (US PN 4664690), as applied for claims 5 and 6 above, and in further view of Powers (US PN 4165223).

With regard to claims 14 and 15, Gänsicke in view of Karbassiyoon, Achener, and Kyoto does not explicitly disclose an external scavenging gas flowing around the outer cladding of the tube strand in the region of the heating zone with the external scavenging gas having a water content a factor of 10 greater than the water content of the internal scavenging gas, and where the same gas is used for both the internal and external scavenging gas.

Powers teaches an external scavenging gas flowing around the outer cladding of the tube strand in the region of the heating zone, where the same gas, and thus resulting gas composition, is used for both the internal and external scavenging gases (col. 6, line 27-29; figure 5, item 82, arrows representing the same gas flowing from the inner channel, coming out from bottom of tubular perform and through the perform walls). Although Powers does not explicitly teach a water content of the external

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scavenging gas a factor of 10 greater than the internal scavenging gas, it would have been obvious to one of ordinary skill in the art at the time of the invention that the internal scavenging gas, after removing the water contaminant from the inner channel portion of the glass tube preform, would contain the removed water as it passed the external surface of the preform, with the amount of water present in the external gas dependent on the water uptake.

It would have been obvious to one of ordinary skill in the art at the time of the invention to use the same gas for the external and internal scavenging gas as taught by Powers, with the dehydrating process taught by Gänsicke in view of Karbassiyoon, Achener, and Kyoto. The rationale to do so is provided by the motivation in the teaching of Powers, that drying the preform using this method predictably results in a reduction in the profile distortion of the index of refraction of the optical fiber (col. 11, 20-25).

14. Claim 16 is rejected under 35 U.S.C. 103(a) as being unpatentable over Gänsicke (US PN 6516636 B1) in view of Karbassiyoon (US PN 4632684), Achener (US PN 3907536), Kyoto (US PN 4664690), and Powers (US PN 4165223), as applied for claims 5 and 14 above, and in further view of DeLuca (US PN 3933454).

With regard to claim 16, Gänsicke in view of Karbassiyoon, Achener, Kyoto, and Powers does not explicitly disclose the external scavenging gas flowing around the outer cladding of the tube strand while the strand is cooled to a temperature below 900°C. Although Powers teaches the scavenging gas flow continues through the initial

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dehydration and consolidation phases (col. 8, line 25-34; col. 13, line 45), Powers does not make any mention of the gas flow, whether present or absent, with regard to the cooling step (col. 13, line 46-47).

DeLuca teaches the external scavenging gas flowing around the outer surface of the preform while the preform is cooled to a temperature below 900°C after the consolidation process (col. 9, line 37-38, 55-59; col. 10, line 17-20; figure 4, item A-D, and 74).

It would have been obvious to one of ordinary skill in the art at the time of the invention to flow the scavenging gas at the temperatures taught by DeLuca in the method taught by Gänsicke in view of Karbassiyoon, Achener, Kyoto, and Powers. The rationale to do so is found in the motivation provided by the teaching of DeLuca, that to provide the scavenging gas as the temperature is lowered below 900°C predictably results in a slight annealing of the dense glass body with low water content (col. 10, line 17-20, 25-27).

15. Claim 18 is rejected under 35 U.S.C. 103(a) as being unpatentable over Gänsicke (US PN 6516636 B1) in view of Karbassiyoon (US PN 4632684), Achener (US PN 3907536), and Kyoto (US PN 4664690), as applied for claims 5 and 17 above, and in further view of Freund (US PN 4685945).

With regard to claim 18, Gänsicke in view of Bartsch and Kyoto does not explicitly disclose an OH reduction treatment with a deuterium-containing atmosphere.

Freund teaches OH reduction treatment with a deuterium-containing atmosphere.

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It would have been obvious to one of ordinary skill in the art at the time of the invention to use a deuterium-containing atmosphere to dehydrate the glass in the method taught by Gänsicke in view of Karbassiyoon, Achener, and Kyoto. The rationale to do so is provided by the motivation found in the teaching of Freund, that to use a deuterium-containing atmosphere predictably avoids the formation of additional OH in the glass over time (col. 3, line 17-24).

Conclusion

16. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Ritt (US PN 4516998): teaches flow restriction of the gas through the glass tube by narrowing of the passageway..

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Elizabeth Royston whose telephone number is 571-270-7654. The examiner can normally be reached on M-Th 8:00am - 5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Christina Johnson can be reached on (571) 272-1176. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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/E.R./

Patent Examiner, GAU 1791

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